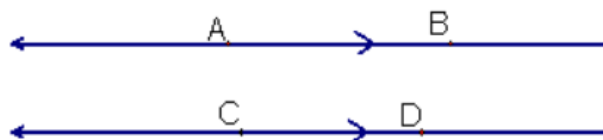


204 Notes 3.1 and 3.2

3.1 Relationships between Lines

Parallel lines—two lines are parallel if they are coplanar and do not intersect.

$$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$$

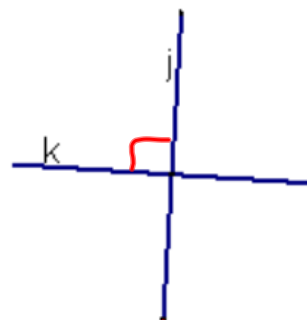


Means Parallel

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Perpendicular lines—two line are perpendicular if they intersect to form a right angle.

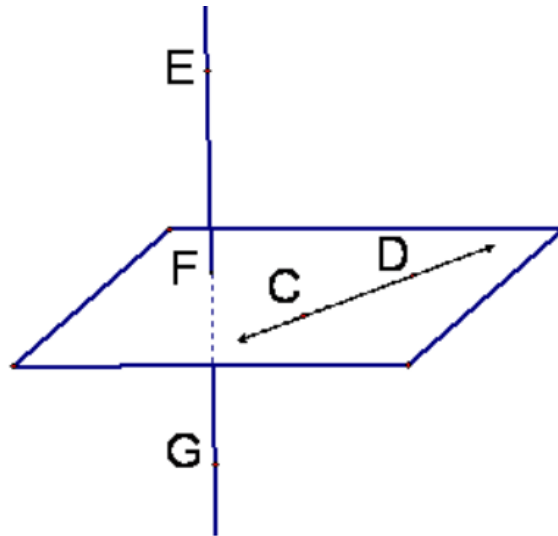
$$j \perp k$$



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Skew lines—two lines are skew if they are **not** coplanar and they do **not** intersect.

\overleftrightarrow{CD} and \overleftrightarrow{FG} are skew



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Use the figure to the right. (The figure is a right prism.)

Name 2 skew lines.

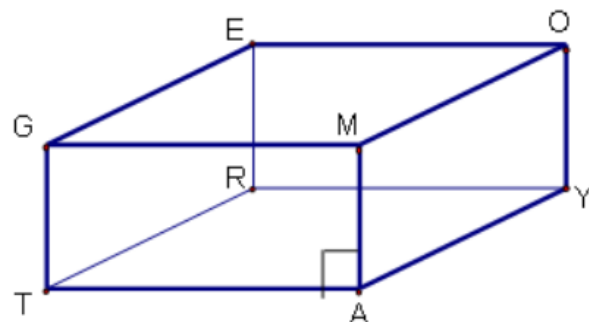
$\overleftrightarrow{EO} \perp \overleftrightarrow{MA}$

Name 2 parallel lines.

$\overleftrightarrow{GE} \parallel \overleftrightarrow{TR}$

Name 2 perpendicular lines.

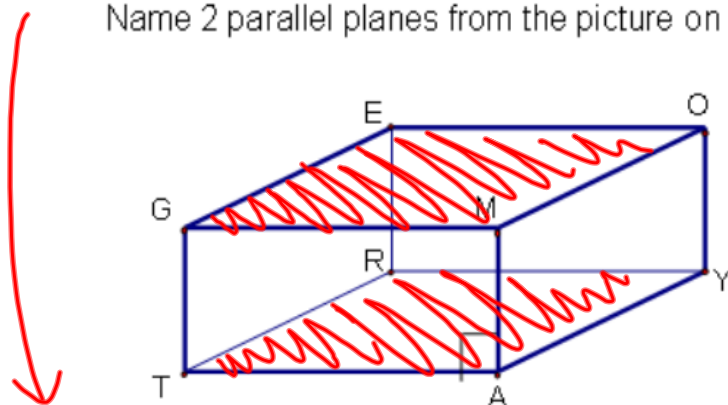
$\overleftrightarrow{MA} \perp \overleftrightarrow{YA}$



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Parallel planes—planes that do not intersect.

Name 2 parallel planes from the picture on the previous page.



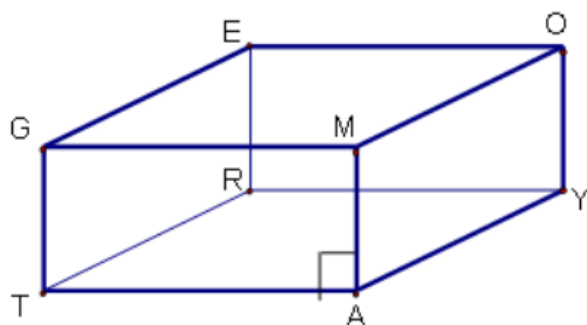
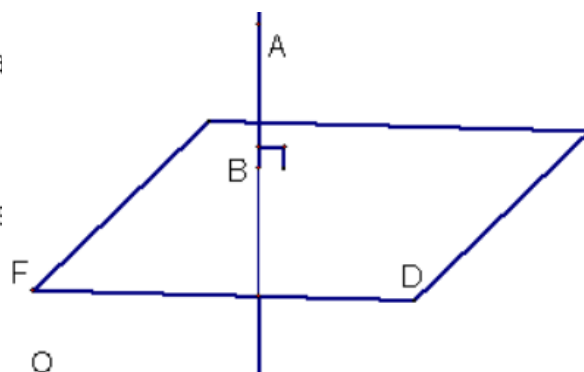
plane RYAT || plane GEMO

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A line can be perpendicular to a plane.

In the figure to the right, $AB \perp$ plane

Name a plane and line that are \perp from the picture on the previous



plane GEMO \perp \vec{AB}

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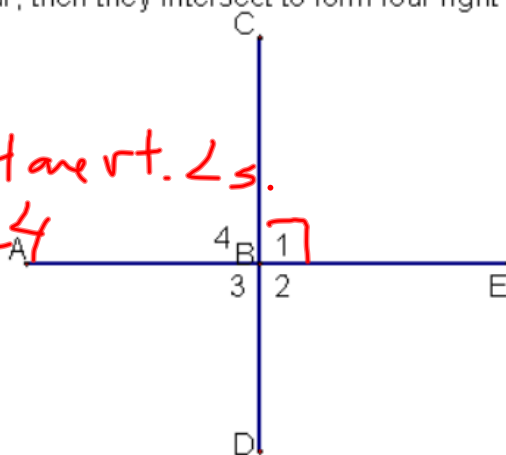
3.2 Theorems about Perpendicular Lines

Theorem 3.1—All right angles are congruent.

Theorem 3.2—If two lines are perpendicular, then they intersect to form four right angles.

Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

Conclusions: $\angle 1, \angle 2, \angle 3, \angle 4$ are rt. \angle s.
 $\angle 1 \cong \angle 2 \cong \angle 3 \cong \angle 4$



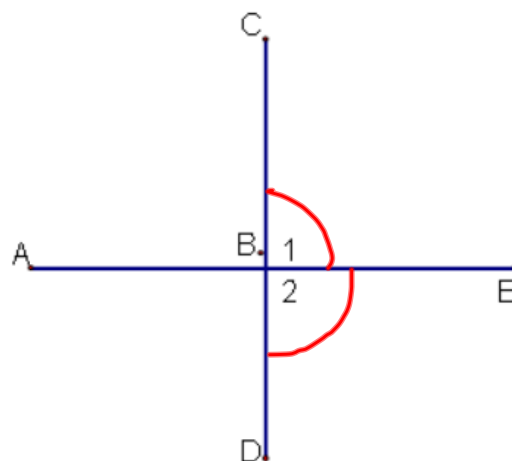
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Theorem 3.3—If two lines intersect to form adjacent congruent angles, then the lines are perpendicular.

Given: $\angle 1 \cong \angle 2$

Conclusion:

$\overleftrightarrow{CB} \perp \overleftrightarrow{BE}$

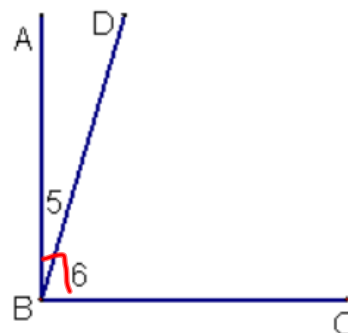


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Theorem 3.4—If two sides of adjacent acute angles are perpendicular, then the angles are complementary.

Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$

Conclusion: $\angle 5 + \angle 6$ are compl.



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EXAMPLES:

Match the statements with the appropriate justification.

1. d $\angle 9$ and $\angle 10$ are complementary

2. b $\angle 1$ and $\angle 2$ are right angles

3. a $\angle 1 \cong \angle 2$

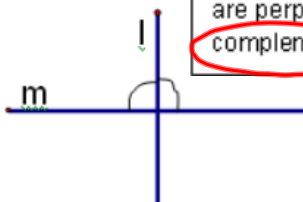
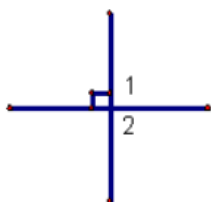
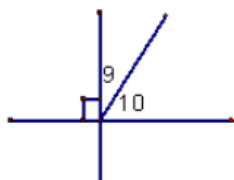
4. c $l \perp m$

a. All right angles are congruent.

b. If two lines are perpendicular, then they intersect to form four right angles.

c. If two lines intersect to form adjacent congruent angles, then the lines are perpendicular.

d. If two sides of adjacent acute angles are perpendicular, then the angles are complementary.



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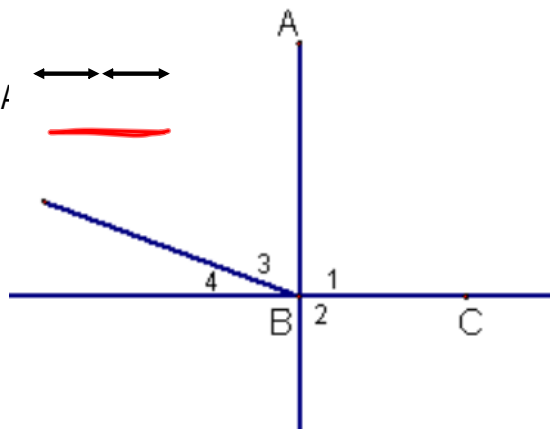
Use the picture to the right, match the conclusions to the theorems.

5. b Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$; Conclusion: $\angle 1$ and $\angle 2$ are right angles

6. a Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$; Conclusion: $\angle 1 \cong \angle 2$

7. d Given: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$; Conclusion: $\angle 3$ and $\angle 4$ are complementary

8. c Given: $\angle 1 \cong \angle 2$; Conclusion: $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$



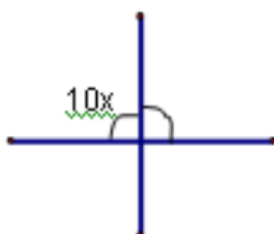
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9a.

$$x = 9$$

$$10x = 90$$

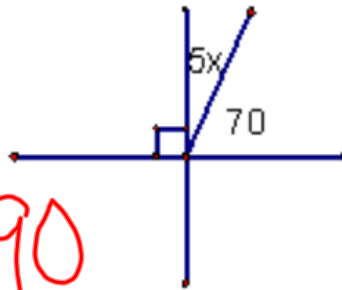
$$x = 9$$



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9b.

$$x = \underline{4}$$



$$5x + 70 = 90$$

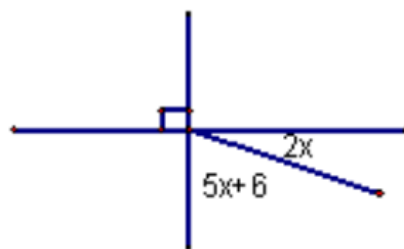
$$5x = 20$$

$$x = 4$$

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10a.

$$x = \underline{12}$$



$$2x + 5x + 6 = 90$$

$$7x = 84$$

$$x = 12$$

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10b.

4

 $x =$ _____

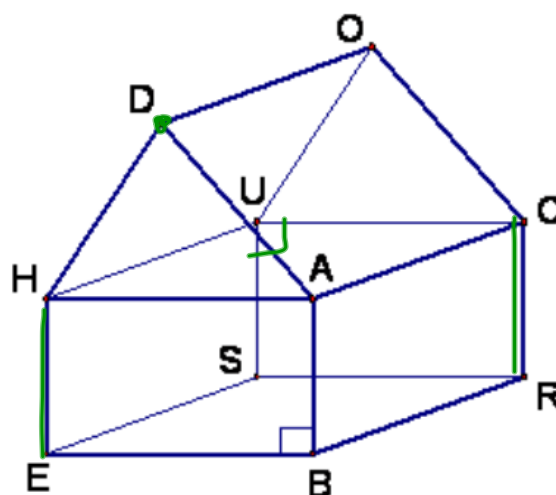
$$20x - 6 + 4x = 90$$

$$24x = 96$$

$$x = 4$$


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True or False

11. F \overrightarrow{HA} and \overrightarrow{AC} are skew12. T plane $SEB \parallel$ plane HI 13. F plane $ACR \parallel$ plane UI 14. F $\overrightarrow{DH} \parallel \overrightarrow{DA}$ 15. T $\overrightarrow{AB} \perp \overrightarrow{BR}$ 16. T $\overrightarrow{EB} \perp$ plane ACR 17. T \overrightarrow{EB} and \overrightarrow{CR} are skew18. T $\overrightarrow{HE} \parallel \overrightarrow{CR}$ 19. T $\overrightarrow{HA} \parallel \overrightarrow{EB}$ 20. T $\overrightarrow{US} \perp \overrightarrow{UC}$ 

On Own

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Homework
p110-111 #s 9-19, 21-24
p117-118 #s 12-14, 17-24

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